PRODUCTION AND STRUCTURAL AND MAGNETIC CHARACTERIZATION OF A Bi$_{1-x}$Lu$_x$FeO$_3$ SYSTEM

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A series of Bi$_{1-x}$Lu$_x$FeO$_3$ samples with different Lu concentrations ($x = 0$, 0.25 and 0.3) was prepared by solid state reaction. Scanning Electron Microscopy (SEM) evidences polycrystalline particles with predominantly granular behavior. Rietveld refinement of experimental X-ray diffraction patterns shows that Lu-doped BiFeO$_3$ crystallizes in a distorted perovskite with R3c rhombohedral symmetry and the lattice parameters decrease as Lu concentration increases. VSM Magnetometry measurements were performed to assess the effect of substitution of Bi ions by Lu ions on the magnetic properties of BiFeO$_3$. Magnetization-temperature curves of zero field cooled and non-zero field cooled (FC) show that close to 250 K, a transition can be observed. In addition, near 120 K, an anomalous curvature type Van Vleck originated from Lu$^{3+}$ substitution can be noticed. The results obtained from all the techniques evidence the effect of Lu on the physical properties of BiFeO$_3$.

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